

Appln No. 09/835,711
Amdt. Dated October 26, 2004
Response to Office action of August 27, 2004

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REMARKS/ARGUMENTS

The Applicant appreciates the Examiner's indication of the allowability of claims 159 and 169 under the conditions indicated in the Office Action.

Claim objections

It is respectfully submitted that the above-described amendment of claim 159 to correct the error indicated by the Examiner overcomes the Examiner's objection.

35 U.S.C. 103(a) rejections

Hackleman et al. (USP 5,600,354) in view of Grande et al. (USP 6,037,957)

It is respectfully submitted that the subject matter of pending independent claim 159, and claims 156, 160, 161, 164, 165, 167, 168 and 170 dependent therefrom, is not taught or suggested by newly cited Hackleman in view of newly cited Grande for at least the following reasons.

In the printhead assembly of the present invention, power busbar 465 and ground busbar 466 are interconnected to bond pads along one edge of print head chip 431 via region 554 of TAB film 470. Busbar contacts 552 permit connection to the busbars at a large number of at locations along the surface of the TAB film and connecting lines 553 provide a large number of interconnects to the print head chip. This arrangement provides low resistance power and ground distribution, as well as a flexible means of connecting the rigid busbar rails to the fragile print head chip (see page 50, lines 1-18; and page 59, lines 27-33 and Figs. 102 and 103 of the corresponding PCT specification).

Pending independent claim 155 is directed to this arrangement by reciting that the interconnect means (the TAB film) is configured to connect the power and ground supply points (the printhead bond pads) to the power and ground busbars along one edge of the printhead.

Hackleman discloses a printhead 10 in which individual printhead elements 1-2N are mounted on a interconnect circuit 138 and are serially connected to each other either row-by-row (Fig. 4) or alternately along rows (Fig. 5). In both arrangements, contact pads 154 are provided along two edges of each element so as to permit the serial interconnection and connection of a printhead driver for each element. A supply bus 160 and ground bus 162 are

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also mounted on the interconnect circuit 138 and are interconnected to the contact pads 154 of the printhead elements via conductors 164 and 166 so as to power the printhead drivers (see col. 8, line 5-col. 9, line 8 and Figs. 7 and 8 of Hackleman).

Thus, in any arrangement of Hackleman the buses 160 and 162 are necessarily interconnected to the individual printhead elements 1-2N making up the printhead 10 along more than one edge of the printhead 10 in order to provide the required serial connection between the printhead elements and the required connections for the printhead drivers. Therefore, as correctly identified by the Examiner, Hackleman does not teach or suggest an arrangement in which the buses are interconnected along one edge of the printhead, as required by pending claim 155.

The Examiner attempts to make up for this deficiency in Hackleman by citing Grande. Grande discloses a microchannel print head 12 in which drive circuits 158 for driving individual transfer electrodes 46 located along microchannels 42 formed in a substrate 48 are interconnected to a ground line 65 and power supply lines 66 via solder bumps 54 (Fig. 4). Fig. 4 shows that a power supply line 66 may be provided adjacent the ground line 65 along one side of the substrate 48, and as such, even though not shown, the Examiner appears to consider that this results in interconnection to the print head solder bumps 54 being provided along one edge of the print head. However, this is not the case for similar reasons to Hackleman above. That is, like the contact pads 154 of Hackleman, the solder bumps 54 of Grande are not positioned along one edge of the print head, but are positioned along both edges of the print head for interconnection with the integrated circuit package 58 containing the drive circuitry for the transfer electrodes.

It is immaterial where the power and ground busbars are located in relation to the printhead in either Hackleman or Grande, since in both arrangements the contacts to the driver circuits of the printheads, and therefore the interconnects to the power and ground busbars, must be positioned to provide power and ground supplies to the driver circuits which is necessarily along multiple edges of the printhead. Moreover, the interconnects (contact pads 154) of Hackleman are also positioned along multiple edges of the printhead to provide the serial connection of the printhead elements. Thus, in any combination of Hackleman and Grande there would be no motivation for one of ordinary skill in the art to modify the location of the contact pads 154 of Hackleman.

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Therefore, the subject matter of pending claim 155, and claims 156-161 and 163-170 dependent therefrom, is not taught or suggested by Hackleman either taken alone or in combination with Grande.

Hackleman in view of Grande further in view of Childers (USP 5,471,163)

It is respectfully submitted that the subject matter of claims 157, 158 and 166 is not taught or suggested by Hackleman in view of Grande and further in view of Childers for at least the above discussed and following reasons.

Childers merely discloses the use of flexible tab circuits to interconnect a printer and a printhead installed in the printer. The substrate 11 of the tab circuits are provided with openings 15 and 21 for external electrical contacts and bonding window openings 19 for integrated circuit printheads which are interconnected by conductive traces 17. Even though the printhead are not shown, the openings 19 are clearly located so as to interconnect on more than one edge of the printheads (see col. 3, lines 1-15 and Fig. 1).

Therefore, Childers does not make up for the above-discussed deficiencies in either Hackleman or Grande. Thus, the subject matter of pending claim 155, and claims 156-161 and 163-170 dependent therefrom, is not taught or suggested by Hackleman either taken alone or in combination with Grande and Childers.

Hackleman in view of Grande further in view of White et al. (USP 5,494,698)

It is respectfully submitted that the subject matter of claim 163 is not taught or suggested by Hackleman in view of Grande and further in view of White for at least the above discussed and following reasons.

White merely discloses MEMS processing for thermal inkjet printheads. White does not teach or suggest any interconnection between printheads and power and ground supplies.

Therefore, White does not make up for the above-discussed deficiencies in either Hackleman or Grande. Thus, the subject matter of pending claim 155, and claims 156-161

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and 163-170 dependent therefrom, is not taught or suggested by Hackleman either taken alone or in combination with Grande and White.

The Applicant is respectfully disappointed that newly cited Hackleman and Grande were not previously cited by the Examiner, particularly since pending claim 155 recites the subject matter of previously presented claim 155 incorporating the subject matter of dependent claim 162. Therefore, the Applicant reasonably expected that these references would have been uncovered in the Examiner's search under MPEP §904 at first instance.

It is respectfully submitted that all of the Examiner's objections and rejections have been traversed. Accordingly, it is submitted that the present application is in condition for allowance and reconsideration of the present application is respectfully requested.

Very respectfully,

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